

Does Country Matter for Subjective Well-Being?

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Abstract It is known that characteristics of individuals explain only a part of the variations in Subjective Well-Being (SWB) between people. The country of origin of an individual accounts for a significant part of these differences. We study what drives the variations in SWB between countries after taking individual characteristics into account. We base our analysis on data from the four waves of the World Values Survey. 64% of the variations between the countries in the sample (64 countries) are explained by the natality rate, life expectancy, the level of corruption and a Muslim culture. This adds to the discussion on the link between economic conditions and SWB. The economic situation is not an explanatory variable in a direct way but indirectly affects SWB through some of the significant variables. Corruption has detrimental effects on SWB beyond its economic consequences.

Keywords Subjective well-being · Country · World values survey · Corruption

1 Introduction

Latin Americans seem to be very cheerful people, while Scandinavians, say, appear to be more distant and less joyful—often attributed to the climate in their country. However, in surveys on life satisfaction, the opposite is recorded: people from Northern European countries generally report higher levels of happiness than those in Latin American countries. The objective of this paper is to explore which nation-wide characteristics explain differences in average life satisfaction of different countries.

In 1967, Warner Wilson reported the “happy person” as a “young, healthy, well-educated, well-paid, extroverted, optimistic, worry-free, religious, married person with high self-esteem, job morale, modest aspirations, of either sex, and of a wide range of intelligence” (Wilson 1967). Since then, many other studies have explained the sources of self-reported life satisfaction of the individual (see Diener et al. 1999, for a survey on this

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topic). According to these studies, the most significant individual characteristics that influence subjective well-being are the subjective state of health, age, income and education. In addition, to explain individual well-being, control variables for country of origin and also country-specific variables such as national income, for example, have proved to be significant (e.g., Helliwell 2003). In this paper we build on this work and intend to explain the differences that remain in life satisfaction between countries, once the individual characteristics of people have been taken into account.

Differences in *individual* subjective well-being have also been traced back to macro-economic variables such as the growth of a country's GDP or public policy measures such as unemployment benefits and other government actions (Diener et al. 1995, and Di Tella et al. 2003). Our unit of analysis is the country and we are concerned with those remaining differences in subjective well-being between countries once individual characteristics and transient country characteristics have been taken into account. In other words, we look for permanent characteristics of countries that explain differences in life satisfaction—among these we study social, cultural and economic variables. Among the social variables, we include the size of the population, infant mortality, life expectancy, natality rate, health expenditure, suicide rate and the abortion rate.

The impact of a country's culture on subjective well-being (SWB) has been explained through different culture-dependent definitions of achievement (e.g., Luo and Gilmour 2004, and Uchida et al. 2004). The available studies that link culture and happiness do so based on psychological models and experimental studies in small groups. We study the satisfaction differences between countries using the data of the four waves of the World Values Survey (WVS) (<http://www.worldvaluessurvey.org/>). The data set consists of answers from more than 100,000 individuals who report their SWB and a range of demographic and personal information. Cultural differences enter our study not at the individual level but as a specific characteristic of a country. For instance, if a country has a high percentage of Roman Catholics we consider the country “Catholic” although specific individuals may not profess that faith. Moreover, the state of the civil society is captured in variables such as the level of corruption and the quality of government.

Among the economic variables, we include the GDP and the real GDP growth rate, both directly and per capita, as well as the level of inflation in a country and its change from the year before.

We show that, in our model, economic variables are not significant in *directly* explaining consistent differences in life satisfaction between countries. However, several explanatory variables such as the level of corruption or natality rate are related to the economic development of a given country, and so economics certainly does matter, although indirectly, when explaining differences in life satisfaction between countries. This may provide an explanation for the apparent contradiction between the studies at the individual level (e.g., the “Easterlin Paradox”, Easterlin 1974) and comparison studies at the country level (Di Tella et al. 2003).

Empirical assessments of well-being sometimes use questions that refer to “life satisfaction”, sometimes to “happiness”, and sometimes ask people to assess the overall quality of their life. No matter which format or wording is used, the findings tend to be similar (Layard 2005), which suggests that people understand the question in the same way. In spite of that, happiness and life satisfaction—although related—are two different concepts. Following the classical Aristotelian definition, we understand happiness as the result of living a good life, which makes it a more stable state of being than satisfaction. In this paper, our empirical basis is the WVS (which surveys SWB) and we therefore deal with subjective well-being (SWB) and life satisfaction, instead of happiness.

The paper is organized as follows: We begin by presenting the known sources of individual SWB as reflected in the literature. Next, we introduce our two-step regression model to analyze the difference between SWB in countries. The first step of the regression analysis mirrors Helliwell (2003). The genuine contribution of our paper comes in the second step. After discussing our results we finish the paper with a summary and conclusion section. The findings of our paper can suggest policies that a country could apply to improve the life satisfaction of its citizens.

2 Sources of Subjective Well-Being: A Review of the Literature

The papers that deal with individual SWB are abundant (see Diener et al. 1999, for an overview). One strand of research deals with general sources of SWB as reflected in the characteristics of individuals. These characteristics can be unique like income or number of children, etc., or can be shared with others, such as the average income in a given country or the level of trust in others in that country.

A different strand of research consists of studies that focus on the relation between a social phenomenon and SWB. Examples of this research include studies on the impact on SWB of suicide rates, religious beliefs or income.

Helliwell (2003) presents the most comprehensive study so far that relates individual variables to SWB (see also Ball and Chernova (2008) for a more recent related study). First, Helliwell (2003) studies individual characteristics and their effect on SWB, and in a second step he adds national variables. He includes variables such as the state of health, employment situation, marital status, age, level of education, beliefs, trust in others and controls for the part of the world to which the respondent belongs. The national variables that are added in the second step are: the average income of the country, quality of government, average level of education and the average answers to the questions about beliefs and so on. Helliwell (2003) uses data from three waves of the WVS and concludes that the state of health and the employment situation are the most significant variables for SWB. A one-point improvement on the one-to-five scale for state of health corresponds to an increase of 0.61 in SWB—which has a scale of one to ten. Likewise, being employed (versus unemployed) increases SWB by 0.61. Other studies using different databases have also pointed out the importance of the subjective state of health, although not always as the most important driver of satisfaction (Michalos 2004). Clark and Oswald (1996) and Di Tella et al. (2003) also report the negative impact of unemployment on SWB.

Helliwell (2003) agrees with the previous research (Diener et al. 1999) that being married has a positive impact on SWB compared to any other marital status. The effect is only slightly lower than being employed (0.42).

Helliwell (2003) finds that the level of education has no significant direct impact on SWB. He suggests that more education usually translates into higher income which, in turn, affects SWB. With respect to age, there is no general agreement on its effect on SWB. Wilson (1967) found that the young are happier, some researchers found that the very young and very old are slightly happier than the middle aged (Blanchflower and Oswald 2000), while others found no effect whatsoever (Myers and Diener 1995; Diener et al. 1999).

In line with other researchers (for example Ellison 1991), Helliwell (2003) also confirms the positive impact of religious beliefs and activities and trust in others on SWB. The position in the income distribution of a society affects SWB but in a quadratic manner, reflecting diminishing marginal effects as one moves from a lower to a higher layer in society.

Adding national variables does not significantly change the estimates mentioned here, but it does allow gauging of the effects of some macro variables on the individual. For example, the average level of trust in others in a society adds some explanation to the SWB beyond the individual level of trust in others.

The second strand of research has focused on the effect of specific social or economic phenomena on SWB. Helliwell and Huang (2006) show that there is a strong link between social capital in a country, reflected by the quality of government, trust in institutions, the level of corruption, etc., and SWB.

Di Tella et al. (2003) show that economic changes—such as recessions or booms—have a strong influence on SWB of countries. Moreover, economic policy differences—for example unemployment benefits—also explain differences in SWB between countries.

Another study of this type is Helliwell (2004) who relates suicide rates and SWB. For most countries, suicide rates and SWB are strongly negatively correlated and thus do not contradict each other. However, Helliwell (2004) shows that explanatory variables for SWB are very similar for male and female, while this is not the case for the suicide rate.

Our approach is different from previous studies in that the unit of analysis is the country rather than the individual, but at the same time not limited to one social phenomenon. The work on individual sources of SWB presented above is the natural starting point for our analysis. In fact, it will be the first step of our two-step regression procedure. The impact of social phenomena on SWB in a country presented above is a natural candidate for the comparison of SWB between countries (and is the second step of our two-step regression procedure).

3 Explaining Differences in SWB Among Countries

The purpose of this paper is to find the country characteristics that make people feel more or less satisfied. To accomplish this task we follow a two-step procedure. First, we analyze individual life satisfaction as the dependent variable using as explanatory variables individual characteristics of the respondents, some country-specific variables and a dummy variable for each country represented in the sample. The coefficients of the country dummy variables can be interpreted as the difference in life satisfaction associated with the mere fact of living in a different country. These coefficients form the dependent variable in the second step of our analysis. We try to find the country characteristics that explain the coefficients and thus, overall, we intend to identify national variables that account for differences in well-being (2nd step), once all the individual characteristics of people have been taken into account (1st step).

3.1 First Step: Analysis at the Level of the Individual

The data for the first step of the analysis are taken from the four waves of WVS data (<http://www.worldvaluessurvey.org/>) for the years 1981–1984 (first wave), 1989–1993 (second wave), 1994–1999 (third wave) and 2000–2004 (fourth wave). This includes a total of 84 countries. The first wave covers 20 countries, most of them European countries and the United States. The second, third and fourth wave cover 42, 54 and 70 countries, respectively. They cover societies from very low- to high-income levels with cultural variations and political differences. However, as not all the 84 countries are surveyed in each wave and some of the questions asked are not the same in each country, there are 64 countries represented in one or more of the four waves and whose data can be used. The national averages of SWB in the WVS are very similar to other data sources [see for

example White (2007) and Veenhoven (2009)]. It is surprising that such different countries as for example Colombia and Denmark are among the countries with the highest average SWB. There has always been a general concern about cross-national comparisons of SWB [see for example Parducci (1995)]. However, Bolle and Kemp (2009) argue that “national differences in rated life satisfaction are real rather than reflecting differences in how satisfaction is rated”. Despite the concern about cross-national comparisons, large sample studies have shown to be very valuable for the understanding of SWB.

There are 106 observations in our sample because not all the 64 countries were surveyed in the four waves. We use 15171, 41041, 25605 and 32464 observations from the first, second, third and fourth waves, respectively, bringing the total number of observations to 114281 in our analysis. With respect to the analysis of Helliwell (2003), we add the data from the fourth wave. In the fourth wave, only in 29 countries was the subjective state of health assessed. We decided to use the observations of those 29 countries from the fourth wave only because the subjective state of health is the variable with most explanatory power¹ for subjective well-being (Helliwell 2003).

A second difference to Helliwell (2003) is a dummy variable for each country which we include instead of his six geographic regions. The coefficients of the country variables are passed as dependent variables to the second step of our analysis.

The first variable (Table 1), *SWB*, is the answer to the survey question about life satisfaction, and ranges from 1 (least satisfied) to 10 (most satisfied). The average of the more than 100,000 subjects included is 6.9 with a standard deviation of 2.3. *Health* is subjective state of health which varies between one (poorest health) and five (best health). *Unemployed* indicates the employment status. The 0.07 mean of this variable indicates that 7% of the subjects were unemployed. The marital status is described in five dummy variables (*married*, *asmarrried*, *divorced*, *separated* and *widow*), with single or never married status being the baseline. The next set of variables describes the age at which subjects finished their education, dividing them into the brackets sixteen to nineteen years (*edu1619*), 20 to 22 years (*edu2022*) and 23 to 29 years (*edu2329*). In an analogous way, subjects are divided into the following age intervals: *age2534*, *age3544*, *age4554*, *age5564* and *age65up*. The baseline is therefore younger than 25 years. The *male* dummy variable describes the subject's sex. *Church* and *God* describe how often people attend church and whether they believe in God, respectively. The variables thus separate the social and private dimension of religious belief. *Mem124* and *mem3* describe the membership in different voluntary organizations except church. In wave three, the question about memberships was asked differently than in the other waves. Following Helliwell (2003) we separate the answer to this question from the third wave in the variable *mem3*. *Nocheat* takes on the value one for those who say that cheating in taxes is never justified and *trust* is one for those who say that in general people can be trusted. The relative income position of the participants (based on a self-reported deciles scale) in their respective society is recorded in *inrelative*. The same variable is also included raised to the power two to capture a possible nonlinear relationship (*inrelative2*).

Table 2 shows the results of our first regression. As expected, our results are very similar to those of Helliwell (2003, Table 2). In fact, except for the educational attainment variables, all variables have very similar coefficients and levels of significance. Educational attainment has historically been linked positively to life satisfaction (e.g., Wilson 1967), but Helliwell (2003) found a barely significant relationship. This he explained by

¹ At the same time the subjective state of health still reflects a distinct reality from subjective well-being (Diener et al. 1998 and Okun et al. 1984).

Table 1 Descriptive statistics of variables in first regression

Variable	Mean	Std. Dev	Min	Max
SWB	6.91	2.35	1	10
Health	2.17	0.91	1	5
Unemployed	0.07	0.26	0	1
Married	0.61	0.49	0	1
Asmarried	0.06	0.23	0	1
Divorced	0.03	0.17	0	1
Seperated	0.02	0.13	0	1
Widowed	0.05	0.23	0	1
edul619	0.37	0.48	0	1
edu2022	0.16	0.37	0	1
edu2329	0.12	0.33	0	1
Agegrp2534	0.24	0.43	0	1
Agegrp3544	0.22	0.41	0	1
Agegrp4554	0.15	0.36	0	1
Agegrp5564	0.11	0.32	0	1
Agegrp65up	0.09	0.29	0	1
Male	0.50	0.50	0	1
Church	0.29	0.45	0	1
God	0.48	0.50	0	1
Mem 124	0.33	0.82	0	
Mem 3	0.15	0.59	0	
Nochcat	0.58	0.49	0	1
Trust	0.32	0.47	0	1
Inrelative	0.48	0.25	0.1	1
Inrelative2	0.29	0.26	0.01	1
Wave2	0.36	0.48	0	1
Wave3	0.22	0.42	0	1
Wave4	0.28	0.45	0	1

114281 Observations

In addition, there are dummies for each of the following 64 countries

Albania, Algeria, Argentina, Australia, Austria, Bangladesh, Belgium, Bosnia and Herzegovina, Brazil, Bulgaria, Belarus, Canada, Chile, China, Colombia, Czech Republic, Denmark, Egypt, Estonia, Finland, France, Germany, Great Britain, Hungary, Iceland, India, Indonesia, Iran, Iraq, Ireland, Italy, Japan, Jordan, Kyrgyzstan, Latvia, Lithuania, Malta, Mexico, Morocco, Netherlands, Northern Ireland, Norway, Peru, Philippines, Poland, Portugal, Puerto Rico, Romania, Russian Federation, Saudi Arabia, Slovakia, Slovenia, South Africa, Spain, Sweden, Switzerland, Taiwan, Turkey, Uganda, United States, Uruguay, Venezuela, Vietnam and Zimbabwe

arguing that better education translates into higher life satisfaction through higher income and better health. In our case, the level of education is entirely insignificant. This may come from the addition of the country dummy variables that can capture the different levels of education of different countries. The effect of education on life satisfaction in prior studies could also be due to differences between countries other than education.

Table 3 shows the coefficients of the country dummy variables from the first regression. These coefficients can be thought of as an index of overall life satisfaction of that country.

Table 2 Results of the first regression

SWB	Coef.	<i>t</i>	<i>P</i> > <i>t</i>
Cons	7.29	130.09	0.000
Health	-0.57	-63.56	0.000
Unemployed	-0.52	-15.84	0.000
Married	0.36	16.48	0.000
Asmarried	0.17	4.66	0.000
Divorced	-0.1	-2.09	0.036
Seperated	-0.35	-5.63	0.000
Widowed	0.03	0.61	0.539
Edu1619	-0.01	-0.43	0.669
Edu2022	-0.04	-1.85	0.065
Edu2329	-0.01	-0.36	0.720
Agegrp2534	-0.21	-8.94	0.000
Agegrp3544	-0.32	-12.01	0.000
Agegrp4554	-0.27	-9.36	0.000
Agegrp5564	-0.02	-0.54	0.588
Agegrp65up	0.28	7.98	0.000
Church	0.08	4.36	0.000
God	0.45	23.72	0.000
Mem 124	0.04	4.32	0.000
Mem3	0.05	3.60	0.000
Nocheat	0.27	18.06	0.000
Trust	0.23	15.33	0.000
Inrelative	2.11	16.32	0.000
Inrelative2	-1.00	-8.78	0.000
Wave2	0.22	9.57	0.000
Wave 3	-0.02	-0.62	0.534
Wave4	-0.16	-5.5	0.000

Number of observations—114281, $F(89,114191) = 329.31$, $\text{Prob} > K = 0.0000$, R -squared -0.22 , Root MSE = 2.0534

Dependent Variable: Satisfaction with your life

Country coefficients are not shown in the table. The details of these coefficients and variables are shown in Table 3

The baseline is the US which has a value of zero. Colombia has the highest index with a value of 1.00 while Zimbabwe has the lowest at -3.17 . The data from Table 3 are used as dependent variables in our subsequent analysis. Figure 1 shows the same information in a histogram.

3.2 Second Step: Explaining Differences Between Countries

3.2.1 Setup

In the second step of our analysis, we aim to explain the country coefficients obtained in the first regression through variables that reflect characteristics of the countries. From this

Table 3 Coefficients for country dummies from first regression

Country	Coeff.	Country	Coeff.	Country	Coeff.
Albania	-2.05	Germany	-0.02	Philippines	-0.45
Algeria	-1.15	Hungary	-0.99	Poland	-0.74
Argentina	-0.11	Iceland	0.49	Portugal	-0.07
Australia	0.26	India	-1.10	Puerto Rico	0.95
Austria	0.35	Indonesia	-0.50	Romania	-1.44
Bangladesh	-1.23	Iran	-1.15	Russian Federation	-1.40
Belarus	-1.37	Iraq	-2.04	Saudi Arabia	-0.18
Belgium	0.11	Ireland	-0.08	Slovakia	-0.69
Bosnia Herzegovina	-1.30	Italy	-0.43	Slovenia	-0.69
Brazil	-0.03	Japan	-0.49	South Africa	-1.30
Bulgaria	-2.18	Jordan	-1.70	Spain	-0.28
Canada	0.17	Kyrgyzstan	-0.44	Sweden	0.55
Chile	-0.09	Latvia	-1.06	Switzerland	0.63
China	-0.40	Lithuania	-1.20	Taiwan	-0.46
Columbia	1.00	Malta	0.39	Turkey	-0.90
Czech Republic	-0.55	Mexico	0.41	Great Britain	-0.09
Denmark	0.73	Morocco	-1.40	Uganda	-1.29
Egypt	-2.18	Netherlands	0.26	Uruguay	-0.27
Estonia	-0.85	Northern Ireland	-0.15	Venezuela	-0.58
Finland	0.31	Norway	0.25	Vietnam	-0.53
France	-0.54	Peru	-0.49	Zimbabwe	-3.17

Reference United States = 0.0

Country coeff.: obs, 64; Mean, -0.55; SD, 0.83; Min, -3.17; Max, 1.00

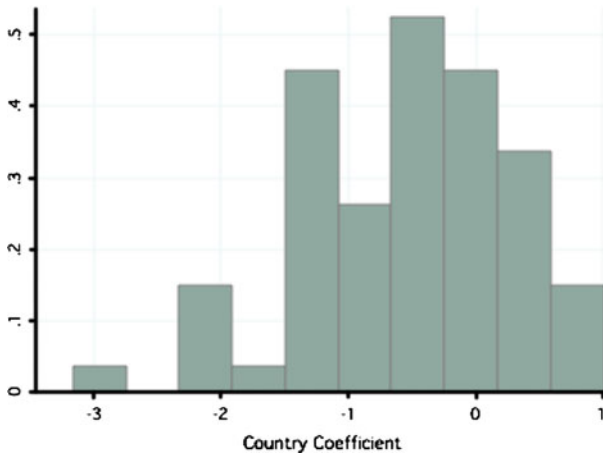


Fig. 1 Histogram of country dummy coefficients from first regressions

point on in the analysis, we only use variables at the level of a country and none at the individual level. Thus, from now on we talk about life satisfaction associated with being in a country (rather than in another country) and no longer about individual life satisfaction.

For most countries there is data from only one wave in the WVS. The data from countries that appear in several waves are averaged for the purpose of our analysis. A full panel analysis with countries and waves as different elements would give way to a very unbalanced panel data set. Moreover, the SWB is quite stable in a given country over the years. We have also conducted the analysis presented below distinguishing the different waves for each country obtaining very similar results.

The coefficients of the country dummies from the first regression indicate the systematic difference in life satisfaction associated with living in that country rather than in the reference country which, here, is the US. A coefficient of, say, -1.0 means that the life satisfaction is reduced by one point with respect to the US.

Table 4 shows summary statistics of the variables used in the second regression. *Country Coeff* is the dependent variable to be explained, i.e., the country coefficients. Notice that the value for Zimbabwe of -3.17 is an outlier (Fig. 1) and thus dropped from

Table 4 Summary statistics of variables second regression

Variable	Mean	Std.Dev.	Min	Max
Country coeff.	-0.55	0.83	-3.17	1
Gdpgrpercap	0.93	7.01	-45.95	10.8
Gdpgrpercap-1	1.37	4.56	-17.88	10.62
Chnggdppercap	-0.44	7.13	-38.07	17.49
Chnggdppercap-1	-0.54	4.20	-9.68	14.31
Realgdpgrowth	3.25	6.70	-11.9	47
Realgdpgrowth-1	2.18	6.47	-41	8.533
Chnggdp	1.07	11.81	-10.13	88
Chnggdp-1	-0.96	6.81	-49	12.4
Lincnat	-1.41	0.80	-3.46	-0.228
Incnat	0.32	0.21	0.03	0.808
Inflation	39.02	101.86	-0.88	709.35
Inflation-1	92.77	341.76	-1.71	2221.02
Chnginf	-53.75	260.18	-1511.67	185.83
Clmginf-1	6.40	183.56	-566.99	1030.79
Pop	71.86	189.29	0.245	1205.34
Log_pop	2.92	1.66	-1.41	7.09
Infntmort	24.53	22.88	4	95
Lifeexp	70.95	7.09	37	79
Natlrt	18.52	7.36	10	45
Qualgov	0.40	1.09	-4	1.94
Corrpt	5.14	2.43	1.3	9.7
Suicrt	20.25	46.86	0.08	345.68
Abortrt	6.58	7.33	0	27.79
Hlthexp	6.22	2.01	2.57	10.35
Muslim	0.20	0.41	0	1
Orthodox	0.06	0.24	0	1
Catholic	0.47	0.50	0	1
Protestant	0.19	0.39	0	1
Others	0.08	0.27	0	1

64 observations

further analysis. *Gdprpercap* and *Gdprpercap-1* are the real GDP growth per capita in the year of survey and the previous year, respectively. *Chnggdppercap* and *Chnggdppercap-1* are the change in growth of the real GDP per capita in the year of the survey and the previous year, respectively. The following four variables in Table 4 contain the same information in absolute terms (*realgdpgrowth*, *realgdpgrowth-1*, *chnggdp*, *chnggdp-1*). *Incnat* and *lincnat* are the national income per capita and its log, respectively.

Inflation, *inflation-1*, *chnginf* and *chnginf-1* are the variables that represent the inflation in the country in the year of the survey, the inflation in the previous year, the change of the inflation in the year of the survey and the change in inflation in the previous year, respectively.

The following variables are the population (*pop*) of the country, its logarithm (*log_pop*) and infant mortality (*infntmort*) as the number of infants dying before reaching 1 year of age, per 1,000 live births in the year. *Lifeexp* is the life expectation at birth and *natlrt* is the natality rate as the number of live births per year per 1000 people. *Qualgov* is the average of six factors describing the quality of a government collected by the World Bank (Kaufmann et al. 2003). *Corrupt* is data from the Corruption Perception Index published by Transparency International. The data ranges from one to ten where a higher number corresponds to a smaller level of perceived corruption. *Suicrt* and *abotrtrt* are the suicide rate per 100,000 people (World Health Organization 2008) and the number of legal abortions per 1000 women (Gutmacher Institute 2008, and Johnstonarchive 2008, respectively). *Hlthexp* is the share of the GDP that a country spends on health (World Health Organization 2008).

Muslim, *orthodox*, *catholics*, *protestant* and *others* are dummy variables for the dominant religious faiths in a given country. In the *others* category are countries like Japan, China or Taiwan. (CIA World Factbook 2008).

The selection of variables is somewhat haphazard and one could ask “why these and not others”? The variables in the first step of the regression are directly linked to the work of Helliwell (2003) and the WVS database. In the variable selection for the second step we have tried to be as exhaustive as possible; we recognize that other variables could have been chosen to represent the same constructs contained in our model such as the economic situation or the cultural and social phenomena.

3.2.2 Results and Discussion

Table 5 summarizes a model that explains the systematic difference in life satisfaction between countries obtained in the 1st regression. This model was obtained by first including all variables explained above and then dropping one by one the non-significant variables. Significant variables are life expectancy and natality rate of the country in question, whether it has a predominant Muslim culture and the level of corruption. Notice

Table 5 Output of 2nd regression

Country coeff.	Coef.	<i>t</i>	<i>P</i> > <i>t</i>
Cons	-7.485	-5.29	0.000
Lifeexp	0.075	4.04	0.000
Natlrt	0.058	4.3	0.000
Muslim	-0.757	-4.11	0.000
Corrpt	0.135	3.75	0.000

Number of obs = 63
F(4,58) = 25.46
 Prob > *F* = 0.000 *R*-squared = 0.64 Root MSE = 0.481

that none of the direct economic variables of a country enters the model. At the individual level (first regression) the income decile of a person was already accounted for.

According to the model, ten years of additional life expectancy in a country increase the systematic difference in life satisfaction by 0.75 points. This is close to one standard deviation in the systematic life satisfaction difference, which is 0.77.

Life expectancy captures the effects of income and its distribution, literacy, health care, sanitation and nutrition (Rao 1988) and thus reflects to a good degree the level of economic development of a country. In this way, our model links economic development to SWB.

The indirect effect of economics on SWB through life expectancy reconciles the often found non-significance of macro-economic variables in explaining SWB (here and in Layard 2005) with the intuition and the results of some studies (see, for example, Ball and Chernova 2008, and Di Tella et al. 2003) that economic development does boost well-being.

With respect to the natality rate, an increase in 10 births per 1000 people translates into an increase of 0.58 in the life satisfaction scale of a country, which is an increase of 0.75 standard deviations of that variable. Interestingly, high natality rates can be associated with low levels of economic development and the need to have many children to secure a future. Higher natality rates may also be associated with a more positive attitude in the culture of a country towards having children. In general, having children is associated with higher levels of life satisfaction (Kohler et al. 2005). Countries with low natality rates may be dominated by a culture that reflects selfishness, and this may translate into lower levels of life satisfaction.

The countries that have a predominant Muslim culture have a drop in their level of life satisfaction of 0.76. It is unclear what the reason for this drop could be. Many of these countries are only emerging economies so that *muslim* may be confounded with relative lack of economic development. Most of these countries are also not democracies. One could claim that this would affect the quality of political governance of the country. However, substituting the *qualgov* variable for *muslim* reduces the overall quality of the model and *qualgov* would itself not be a significant variable. Also, substituting the variable *muslim* with *democracy*, a dummy variable that takes value 1 if a country is a democracy² (CIA World Factbook 2008) does not improve our model. In fact, *natlrrt* would stop being significant.

The level of corruption also significantly affects results. Moving up by one standard deviation on the corruption scale (i.e., reducing corruption) increases the level of life satisfaction by 0.33. This is a remarkable result given that, in the first regression, different variables that could be related to consequences of corruption were already taken into account. Among those variables were the level of trust in others, the subjective legitimacy of cheating and the economic position in society. Still, corruption negatively influences the life satisfaction in a country and has a social cost above and beyond direct individual consequences. This finding agrees with Helliwell and Huang (2006).

It is not surprising that the quality of government (*qualgov*) and the level of corruption (*corrupt*) do not enter the model *together*. Although they are different constructs, corruption is an important dimension of the *qualgov* variable, making them highly correlated.

Note that, in previous studies, the suicide rate has had little explanatory effect on individual life satisfaction (Helliwell 2004). Our analysis shows the same result at the country level.

All variables of the model are strongly significant with *t*-values greater than 3.5 in absolute value. The size of the coefficients is such that the variables also have a strong

² The correlation between the two variables is -0.48 .

effect on the dependent variable. Altogether, the model explains some 64% of the variance in the dependent variable. The mean standard error of the model is 0.481. In the case of Colombia, the prediction error is 1.29, which is more than twice the standard error. In other words, Colombia is among the 5% of the cases that are expected to fall outside the two standard deviation interval. So, our model is not able to explain why Colombia has such a high country coefficient.

3.2.3 Adding Impact of Climate

Helliwell (2004) reports that the geographical position of a country (latitude) and the corresponding differences in climate are significant in predicting the suicide rate of a country. We expect this variable to also have an impact on life satisfaction. The climate becomes more moderate as one moves away from the equator and again becomes more hostile as you approach the poles. Thus, we expect the latitude to have a curvilinear relationship with SWB. To capture this relationship we add the absolute value of the latitude of each country (the geographical center of the country as reported in the CIA World Factbook 2008) and its square to the regression model. The output of this regression is shown in Table 6. There we can see that both variables are significant. The two added variables increase the R^2 from 0.64 to 0.72. Latitude has a negative coefficient. Moving from the equator to Frankfurt (latitude = 50) decreases your life satisfaction by 1.3, which corresponds to almost two standard deviations of the dependent variable. The dependence of SWB on latitude is curvilinear, as expected, but is decreasing in the entire range between equator and poles. It seems that the climate close to the equator is not as detrimental for SWB as we expected.

We observe that, by including these new variables in the original model (Table 5), the coefficient of the natality rate drops from 0.058 to 0.029. The drop is not surprising given that the correlation between natality rate and absolute latitude is -0.68 . The correlation itself seems most likely to stem from economic development: Northern countries are more developed and have lower natality rates. The original impact of the natality rate on life satisfaction (0.058) that is due to economic development appears to be now at least partly captured by the latitude. The remaining coefficient of 0.028 is probably a better estimate of the potential effect of the attitude towards life and children that we discussed above.

4 A Further Exploration: Country Cluster Analysis

In order to get a deeper knowledge on how the variables affect the differences in life satisfaction between countries, we have clustered the countries into six groups. The six groups are formed based on the similarity in the variable country coefficient (*country*

Table 6 Model with absolute value of latitude

	Country coeff.	Coef.	<i>t</i>	<i>P</i> > <i>t</i>
	Cons	-5.949	-4.33	0.0000
	Lifeexp	0.074	4.22	0.0000
	Natlrt	0.029	1.93	0.0580
Number of obs = 63	Muslim	-0.469	-2.59	0.0120
$F(6,56) = 23.72$	Corrpt	0.16	4.43	0.0000
Prob > <i>F</i> = 0.000	Abslatitude	-0.055	-3.46	0.0010
<i>R</i> -squared = 0.72	Abslat2	0.00056	2.66	0.0100
Root MSE = 0.432				

Table 7 Statistics of the relevant variables for the different clusters

Cluster	1	2	3	4	5	6
Number of countries	5	15	17	13	9	5
Average of estimate	-2.33	-1.27	-0.57	-0.10	0.32	0.77
Average of lifeexp	62.0	66.5	71.2	74.0	75.7	75.8
Average of natlrt	23.0	21.5	17.9	17.5	15.9	14.8
Average of muslim	0.60	0.40	0.18	0.08	0.00	0.00
Average of corprt	2.7	3.4	4.2	6.4	8.1	7.7

coeff). The first group contains five countries and has a cutoff country coefficient of -2.0 . The next group starts at -1.7 and runs up to -1.0 , containing 15 countries. The third group runs from -0.9 to -0.4 with 17 countries. The fourth group goes from -0.3 to 0.1 , including 13 countries, the fifth from 0.2 to 0.5 with nine countries, and finally the sixth group ranges from 0.6 to 1.0 and consists of five countries. Table 7 summarizes the within-group averages of the different independent variables that we have identified for the regression model displayed in Table 5. The table confirms the findings of our regression model. The average life expectancy increases as one moves up from one group to the other, although the last three groups show only small differences. As expected, the natality rate decreases as we move to groups with higher country coefficients. The same holds true for the percentage of Muslim countries in each group. The corruption index (inverted scale) increases showing a higher index in the groups of higher country coefficients, with the exception of group six that has a slightly lower index than group five.

The most relevant finding of this exercise comes from looking at the countries that end up in the same group. Table 8 lists the countries that compose each group. In Group 6 we

Table 8 Countries in each cluster

1	2	3	4	5	6
Iraq	Hungary	China	Belgium	Iceland	Columbia
Albania	Latvia	Italy	United States	Mexico	Puerto Rico
Bulgaria	India	Kyrgyzstan	Germany	Malta	Denmark
Egypt	Iran	Philippines	Brazil	Austria	Switzerland
Zimbabwe	Algeria	Taiwan	Portugal	Finland	Sweden
	Lithuania	Japan	Ireland	Netherlands	
	Bangladesh	Peru	Chile	Australia	
	Uganda	Indonesia	Great Britain	Norway	
	South Africa	Vietnam	Argentina	Canada	
	Bosnia Herzegovina	France	Northern Ireland		
	Belarus	Czech Republic	Saudi Arabia		
	Russian Federation	Venezuela	Uruguay		
	Morocco	Slovakia	Spain		
	Romania	Slovenia			
	Jordan	Poland			
		Estonia			
		Turkey			

see two distinct kinds of countries that are both substantially happier than the baseline, which is the US. On the one hand there are three northern European countries, which have high life expectancy, low natality rate and low corruption level. On the other hand Colombia and Puerto Rico are two Latin American countries that achieve the same results albeit in a different way; specifically here corruption in those countries is comparatively high. As mentioned before, our model does not explain well the case of Colombia (and to a some extent the case of Puerto Rico). There must be other variables—other than the ones in our model—that account for this.

We observe a similar pattern in Group 5, made up of occidental, developed countries (including Australia) but that also contains Mexico, which has very different characteristics. Moreover, Groups 2 and 3 contain several former Soviet republics, together with some developing countries. Group 1—the group doing worst with respect to the baseline—also contains countries with quite different characteristics. It shows that there are different ways of attaining the same level of SWB, for good and bad.

5 Summary and Conclusions

In this paper, we have tried to explain what the characteristics of a country are that make people in that country feel more satisfied with their lives than people in other countries, once we have taken into account the individual characteristics of these people.

The main difference between our approach and other papers is grounded in using data from the WVS waves at the level of the individual and—controlling for individual variables—concluding on differences at the level of a country. Those country differences, in turn, are explained by variables at the country level.

It is remarkable that, despite the detailed analysis at the individual level, significant differences in SWB between countries remain unexplained. This refers to both statistical significance (not reported here) and actual size of the coefficients.

We have identified several variables that affect the “satisfaction of a country”. With a model that contains five variables we explain the differences in the well-being of a country. The variables are the following:

- Life expectancy. The higher the life expectancy, the higher chance of well-being in a country.
- Natality rate. The higher the natality rate, the higher the chance of well-being in a country.
- Muslim country. Being in a country with a dominant Muslim culture lowers the chances of well-being.
- Corruption. The lower the corruption, the higher the chance of well-being in a country.
- Latitude. The closer a country is to the equator, the better the conditions of a country to have satisfied people.

Both life expectancy and natality rate are linked to economic development, albeit in the opposite direction. Thus, our analysis is non-conclusive on the question about the *direct* link between economics and SWB. At the same time, both variables bring more than just economics to our model and offer a perspective on ways to foster SWB in a country.

As discussed in the analysis, corruption undermines SWB. The concern that corruption leads to inefficiencies that limit economic progress and thus affect SWB is certainly true, but the picture that emerges from our analysis is more complex: corruption directly reduces

SWB by altering the social fabric and can lead to a sense of frustration. Finally, the dummy variable for a Muslim country is significant.

Our findings suggest that policy makers in a country could focus on a mix of different measures to improve SWB. On the one hand, they should foster honesty in public and private institutions to reduce corruption. On the other hand, to increase the natality rate, policies that favor having children and protect the family could work. Investments in health care, the encouragement of a healthy life style and other measures that increase life expectancy should also help.

One of the surprising results of our analysis is the *dissimilarity* of some countries with *similar* levels of SWB. The variables that we found to be significant to explain the SWB differences between countries seem to affect countries in different ways. This calls for further research about how different sources of SWB affect different countries.

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